INSTALLATION

FX82051 Unmanaged Ethernet Switch

Five 10BASE-T/100BASE-TX Ports and One 100BASE-FX Fiber Port

C2622M (2/07)

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Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the points where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
14. Apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases shall be placed on the apparatus.
15. **WARNING:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
16. Installation should be done only by qualified personnel and conform to all local codes.
17. Use only installation methods and materials capable of supporting four times the maximum specified load.
18. A CCC-approved power cord must be used to power this equipment when used in China.
19. **CAUTION:** These servicing instructions are for use by qualified service personnel only. To reduce the risk of electric shock do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

The product and/or manual may bear the following marks:

This symbol indicates that dangerous voltage constituting a risk of electric shock is present within this unit.

This symbol indicates that there are important operating and maintenance instructions in the literature accompanying this unit.

CAUTION:
RISK OF ELECTRIC SHOCK. DO NOT OPEN.

Regulatory Notices

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RADIO AND TELEVISION INTERFERENCE

This equipment has been tested and found to comply with the limits of a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes and Modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission's rules.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Product Overview

DESCRIPTION

The FX82051 unmanaged Ethernet switch provides five 10BASE-T/100BASE-TX ports and one 100BASE-FX fiber port for the transport of bidirectional Ethernet data. Two fibers are required to transport bidirectional data over the fiber port. Available in multimode and single-mode versions, the FX82051 Ethernet switch is designed for point-to-point applications (refer to Figure 1).

Figure 1. FX82051 Point-to-Point Application

Features of the FX82051 Ethernet switch include the following:

- User-selectable networking functions for each 10BASE-T/100BASE-TX port:
  - Autonegotiation between 10 Mbps and 100 Mbps data rates and between full-duplex and half-duplex modes
  - 10 Mbps or 100 Mbps selectable
  - Full-duplex or half-duplex mode selectable
  - Enabling/disabling of flow control

  NOTE: The 100BASE-FX fiber port is automatically forced to full-duplex 100 Mbps operation.
- Auto MDI/MDI-X (Medium Dependent Interface/Medium Dependent Interface Crossover) operation
- Compliant with IEEE 802.3, 802.3u, and 802.3x standards
- Multimode fiber support for distances up to 6 km
- Single-mode fiber support for distances up to 46 km
- Compatible with other Ethernet equipment:
  - 10BASE-T/100BASE-TX compatibility with all Pelco® and third-party 10BASE-T/100BASE-TX Ethernet devices
  - Fiber optic compatibility with all Pelco Ethernet devices that use two fibers per fiber port
  - Fiber optic compatibility with third-party 100BASE-FX Ethernet devices (applicable to multimode ST and SC versions only)
- Laser diode for transmission of optical signals

  NOTE: The FX82051 switch is a Class 1 laser product that complies with FDA radiation performance standard 21CFR Subchapter J and with IEC 60825-1 Edition 1.2, 2001-08.
- Environmentally hardened

- Designed to meet NEMA TS 2 and Caltrans traffic signal control equipment standards for ambient operating temperature, mechanical shock and vibration, humidity with condensation, high-line/low-line voltage conditions, and transient voltage protection

  NOTE: Conformal coating is required for operation in environments with relative humidity above 95 percent (condensing).

- No performance adjustments required
- 12 VDC or 24 VAC power supply
- Stand-alone and rack-mountable modular design
- LED indicators for monitoring of optic signal/laser status, 100BASE-FX port status including far end fault indication (FEFI), 10BASE-T/100BASE-TX port status, and operating power

MODELS

The FX82051 module consists of the following series of models:

Multimode Models[*]

FX82051MSTR-2	Unmanaged Ethernet switch, five 10BASE-T/100BASE-TX ports, one multimode ST fiber port, two fibers
FX82051MSCR-2	Unmanaged Ethernet switch, five 10BASE-T/100BASE-TX ports, one multimode SC fiber port, two fibers

Single-Mode Models[*†]

FX82051SSTR-2	Unmanaged Ethernet switch, five 10BASE-T/100BASE-TX ports, one single-mode ST fiber port, two fibers
FX82051SSCR-2	Unmanaged Ethernet switch, five 10BASE-T/100BASE-TX ports, one single-mode SC fiber port, two fibers

[*]For conformal coated models, replace the first letter *F* in the model number with the letter *C*. The conformal coated version of FX82051MSTR-2, for example, is CX82051MSTR-2.

[†]Single-mode FC connector is available upon request. Contact the factory for additional information.

OPTIONAL ACCESSORIES

The following optional accessories are available:

WM5002-3U	Wall mount base kit for double-width module
WM5002-3UEXP	Wall mount expansion kit for double-width module
RK5000-3U	19-inch rack mount chassis for 14 slots (no power), 3 RUs
RK5000PS-3U	19-inch rack mount chassis for 12 slots with power, 3 RUs
EPS5000-120	External rack power supply, 1 RU, dual 120 W power outputs
RK5001B-3U	Blank filler panel, single width
RK5002B-3U	Blank filler panel, double width
RK5002-1UEXP	Adapter kit that allows a 3 RU double-width fiber module to be used in RK5000PS-5U rack mount chassis

FRONT PANEL

Figure 2 illustrates the front panel of the FX82051 module.

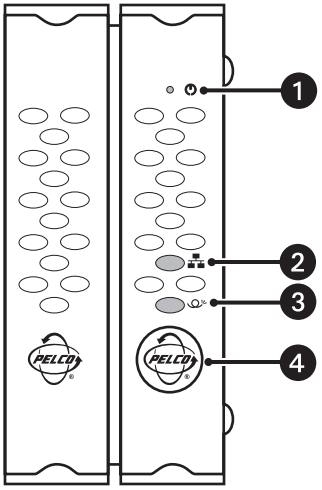

Figure 2. Front Panel of FX82051 Module

1. **Reset Button:** Restarts the unit
2. **100BASE-FX Status LED**
3. **Optic Fault LED:** Optical signal status/laser status indicator
4. **Power LED:** Pelco badge

For detailed information about the front-panel LEDs, refer to *Troubleshooting* on page 17.

REAR PANEL

Figure 3 illustrates the rear panel of the FX82051 module.

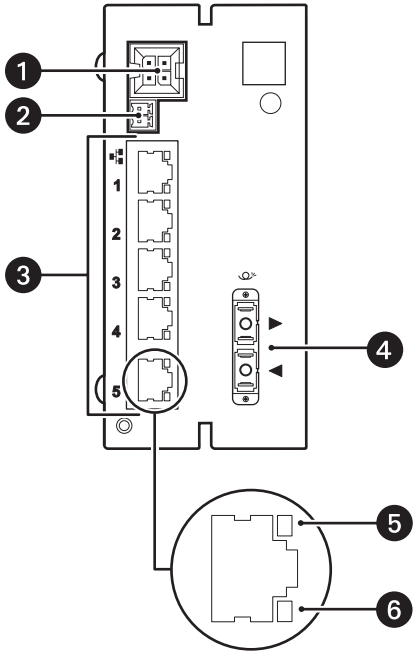

Figure 3. Rear Panel of FX82051 Module (SC Fiber Connector Shown)

1. **Rack Power/Alarm Connector:** 4-pin connector for power/alarm connection of rack-mounted module
2. **Stand-Alone Power Connector:** 2-pin connector for power connection of stand-alone module; removable mating connector with screw terminals (not shown)
3. **10BASE-T/100BASE-TX Ports 1-5:** RJ-45 connectors
4. **Fiber Optic Port:** Dual-fiber ST or SC connector (dependent on FX82051 model)
5. **RJ-45 10BASE-T/100BASE-TX Port Status LED, Left:** Link/activity status indicator
6. **RJ-45 10BASE-T/100BASE-TX Port Status LED, Right:** Duplex mode/collision indicator

For additional information about rear-panel connections, refer to *Installation* on page 10. For detailed information about the RJ-45 LEDs, refer to *Troubleshooting* on page 17.

Installation

PACKAGE CONTENTS

The following items are supplied:

1 FX82051 module

1 Regulated switching power supply with four plug adapters (North American, Australian, U.K., and European configurations); 100-240 VAC, 50-60 Hz input, 12 VDC output

1 Wall clip with two 4-40 x 0.250-inch Phillips pan head screws with lock washers (for attachment of single module to wall)

1 FX82051 Unmanaged Ethernet Switch Installation manual

SETTING 10BASE-T/100BASE-TX PORT MODES OF OPERATION

NOTE: As a matter of convenience, it is recommended that you verify the modes of operation for each 10BASE-T/100BASE-TX port and then change the mode settings—if necessary—before mounting the FX82051 module into a rack or onto a wall.

The FX82051 module provides various configuration options that allow you to select the desired modes of operation for each 10BASE-T/100BASE-TX port (ports 1-5). You can select the desired modes of operation by means of a TX Mode switch that is provided on the bottom of the module for each port (refer to Figure 4).

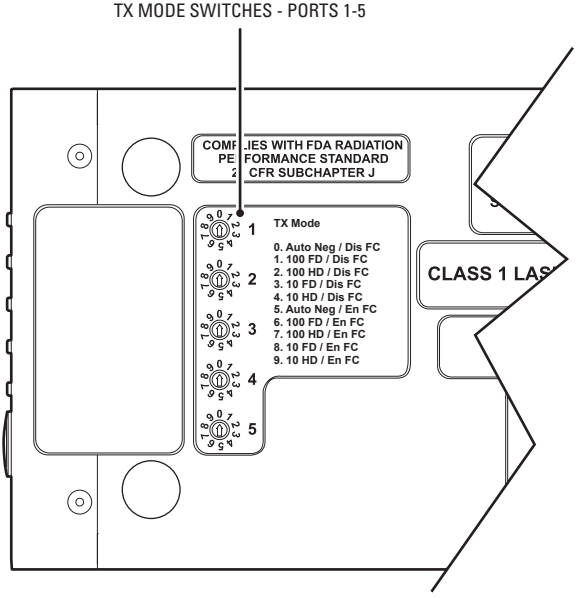

Figure 4. TX Mode Switches for 10BASE-T/100BASE-TX Ports 1-5

Using the TX Mode switch for a particular port, you can do the following:

- Enable autonegotiation or select (force) a specific data rate and duplex mode:
  - Enabling autonegotiation allows the FX82051 module to automatically negotiate with the device to which the port is connected for data rate and duplex modes of operation: 10 Mbps or 100 Mbps data rate and half-duplex or full-duplex mode. The highest common denominator of operational modes is automatically selected.

    Autonegotiation is enabled by default.
  - If autonegotiation is not desired, you can select a specific data rate and duplex mode:
    - Data rate configuration allows you to select 10 Mbps or 100 Mbps.
    - Duplex mode configuration allows you to select half-duplex mode or full-duplex mode.
- Enable or disable flow control. Flow control controls data transmission at the sending device to avoid overfilling buffers and losing data at the receiving device. When the buffers on the receiving device are full, a message is sent to the sending device to suspend the transmission until the data in the buffers has been processed.

  NOTE: For time-sensitive data applications (for example, video and audio applications), it is recommended that flow control be disabled.

  Flow control is disabled by default.

With the FX82051 module powered off, set each TX Mode switch to the desired modes of operation.

NOTE: TX Mode configuration must be set when the module is powered off. If you wish to change a TX Mode switch setting after the module has been powered on, power off the module, change the TX Mode switch setting, and then power on the module again.

Refer to Table A for TX Mode switch settings and corresponding 10BASE-T/100BASE-TX port modes of operation. Note that each 10BASE-T/100BASE-TX port operates independently of one another; therefore, you can set each port to different modes of operation as appropriate.

Table A. TX Mode Switch Settings

TX Mode Switch Position	10BASE-T/100BASE-TX Modes of Operation
0	Auto Neg/Dis FC: Enables autonegotiation between 10 Mbps and 100 Mbps and between half-duplex and full-duplex modes, disables flow control (default setting)
1	100 FD/Dis FC: Selects 100 Mbps full-duplex, disables flow control
2	100 HD/DIS FC: Selects 100 Mbps half-duplex, disables flow control
3	10 FD/Dis FC: Selects 10 Mbps full-duplex, disables flow control
4	10 HD/Dis FC: Selects 10 Mbps half-duplex, disables flow control
5	Auto Neg/En FC: Enables autonegotiation between 10 and 100 Mbps and between half-duplex and full-duplex modes, enables flow control
6	100 FD/En FC: Selects 100 Mbps full-duplex, enables flow control
7	100 HD/En FC: Selects 100 Mbps half-duplex, enables flow control
8	10 FD/En FC: Selects 10 Mbps full-duplex, enables flow control
9	10 HD/En FC: Selects 10 Mbps half-duplex, enables flow control
NOTE: Switch positions 0-4 disable flow control. Positions 5-9 enable flow control.	

MOUNTING

The FX82051 module can be mounted into a rack or can be used as a stand-alone module. As a stand-alone module, the unit can be placed on a desktop or can be mounted to a wall.

NOTE: As a matter of convenience, it is recommended that you set the modes of operation for each 10BASE-T/100BASE-TX port—if required—before mounting the FX82051 module into a rack or onto a wall. For information about setting the modes of operation, refer to *Setting 10BASE-T/100BASE-TX Port Modes of Operation* on page 10.

MOUNTING THE FX82051 MODULE INTO A RACK

The FX82051 module can be installed into an RK5000 Series rack mount chassis, which can be mounted into an industry-standard 19-inch (48.26 cm) equipment rack. The RK5000 Series rack mount chassis includes the following models:

- **RK5000PS-3U and RK5000-3U:** Designed to accommodate fiber optic modules as follows:
  - The RK5000PS-3U rack mount chassis provides 12 single-width module slots and a power supply.
  - The RK5000-3U rack mount chassis provides 14 single-width module slots (a power supply is not included). Power to the modules can be supplied using the optional external power supply (EPS5000-120).

  For additional information, refer to the RK5000PS-3U/RK5000-3U Fiber Rack Mount Chassis Installation manual.
- **RK5000PS-5U:** Designed to accommodate Endura™ modules but can also accommodate fiber optic modules with the use of the appropriate adapter kit. The RK5002-1UEXP adapter kit is required for installation of the FX82051 module into the RK5000PS-5U chassis.

  For information about the RK5000PS-5U chassis, refer to the RK5000PS-5U Rack Mount Chassis Installation manual.

NOTE: The FX82051 module is a double-width fiber optic module that occupies two slots in the RK5000PS-3U, RK5000-3U, and RK5000PS-5U chassis.

MOUNTING THE FX82051 MODULE TO A WALL

The FX82051 module can be mounted to a wall in the following ways:

- Using the supplied wall clip for attachment of a single module to a wall. For installation instructions, refer to *Mounting the FX82051 Module Using the Wall Clip* on page 14.
- Using the optional WM5002 wall mount kits, which are designed for mounting of double-width fiber optic modules. The WM5002-3U base kit allows mounting of a single module to a wall. The WM5002-3UEXP expansion kit allows mounting of an additional module. It is recommended that a maximum of one expansion kit be used with the base kit, allowing a maximum of two double-width modules to be mounted to a wall.

  NOTE: The WM5002 wall mount kits can be used with the WM5001 wall mount kits, which are designed for mounting of single-width fiber optic modules. If mounting a mix of single-width and double-width modules is desired, it is recommended that a maximum of two single-width modules and one double-width module be mounted in combination with one another.

  For mounting instructions using the wall mount kits, refer to the WM5000 Series Wall Mount Kit Installation manual.

Mounting the FX82051 Module Using the Wall Clip

NOTE: Before mounting the FX82051 module to a wall, ensure that there is adequate space at both ends for viewing the front-panel LEDs and for making the various rear-panel cable connections.

To attach the FX82051 module to a wall using the supplied wall clip, refer to Figure 5 and do the following:

1. Using the two vertical or horizontal wall-mounting holes, attach the wall clip to a wall using two screws (not provided).
2. Slide the module into the clip until the two holes on the bottom of the module align with the two holes on the lower flange of the clip.
3. Attach the module to the clip using the two Phillips pan head screws provided for the clip.

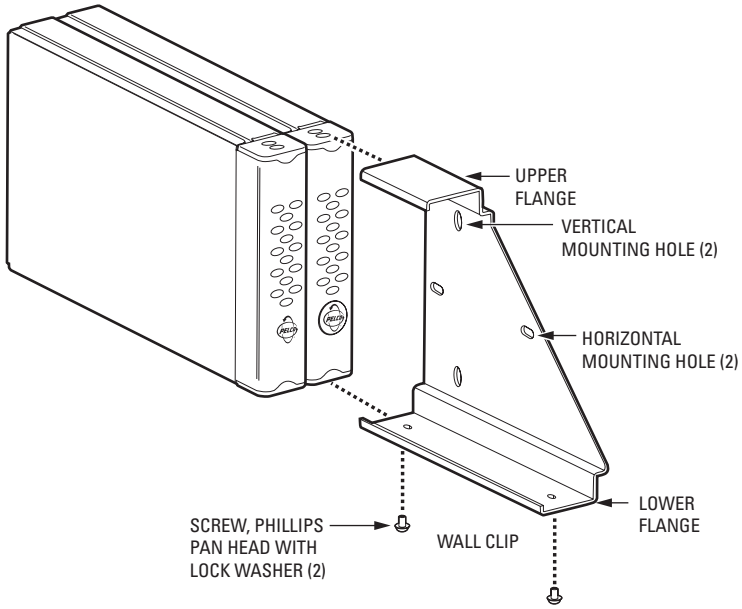

Figure 5. Mounting the FX82051 Module Using the Wall Clip

CONNECTIONS

Connections to the FX82051 module are made on the rear panel of the module (refer to Figure 6).

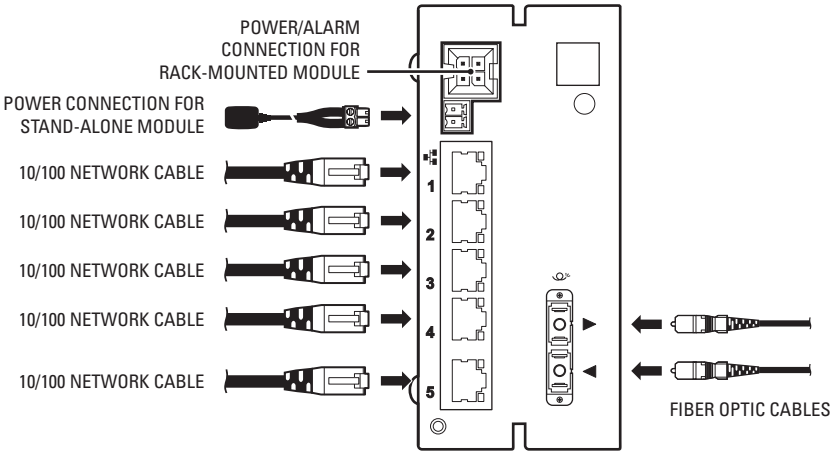

Figure 6. FX82051 Module Connections

As illustrated in Figure 6, FX82051 connections consist of the following:

- Power connection

  NOTES:

  – A 12 VDC or 24 VAC power supply can be used to power the module when used as a stand-alone unit. A 12 VDC power supply is provided. If a 24 VAC power supply is used, the power supply must be a Listed Direct Plug-In Power Unit marked as Class 2 and rated as 24 VAC, 0.50 A (minimum output).

  – In extreme temperature conditions, it is recommended that an industrial-rated outdoor power supply such as the Pelco WCS1-4 power supply be used.

- 10BASE-T/100BASE-TX connections

  NOTES:

  – Use Category 5e or a higher category of cable to connect to a 10BASE-T/100BASE-TX port. Cable length must not exceed 328 feet (100 meters).

  – The 10BASE-T/100BASE-TX ports are auto MDI/MDI-X ports; therefore, either a straight-through or crossover cable can be used. The ports automatically detect the cable type that is used. Refer to *Appendix. RJ-45 Connector Pinouts* on page 26 for RJ-45 MDI/MDI-X pinout information.

- Fiber connections

  NOTE: Refer to Figure 7 for an illustration of fiber port connections in a point-to-point application.

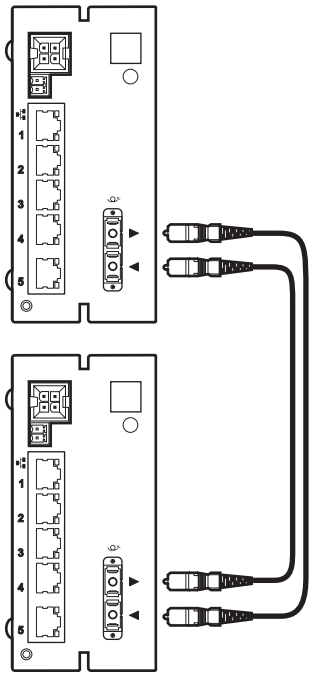

Figure 7. Fiber Port Connections in Point-to-Point Application

Troubleshooting

LED indicators on the front and rear panels of the FX82051 module allow you to monitor operational status:

- LED indicators on the front panel (refer to Figure 2) allow you to monitor operating power, 100BASE-FX port status, and optic signal/laser status. Refer to Table B for information about the front-panel indicators and associated troubleshooting guidelines.
- LED indicators on the rear panel (refer to Figure 3) allow you to monitor RJ-45 10BASE-T/100BASE-TX port status. Refer to Table C for information about the rear-panel indicators and associated troubleshooting guidelines.

Table B. Troubleshooting with Front-Panel Indicators

Indicator Color	Meaning	Possible Cause	Corrective Action
Power LED (Pelco badge)			
Blue	Power is being applied to the module.	–	No action required.
Not lit	Power is not being applied to the module.	Power connection is faulty.	Check power connection. If module is rack mounted, reseat module or power supply as necessary.
		Power supply has failed.	Replace power supply.
		Loss of power occurs due to tripped circuit breakers, blown fuses, or faulty electrical service.	Check circuit breakers, fuses, or electrical service as necessary.
100BASE-FX Status LED ( )			
Green	A fiber link is established.	—	No action required.
Flashing green	Data activity is occurring on the fiber link.	—	No action required.
Red	Far end fault indication (FEFI). The optical signal transmitted from this port is not detected by the remote link partner.	Defective fiber transmit port on local module	Replace local module.
		Laser fault on local module (Optic Fault LED on local module flashes red).	Refer to the *Optic Fault LED* section in this table.
		Defective fiber receive port on remote module	Replace remote module.
	NOTE: The Optic Fault LED on the *remote* module is red. Refer to the *Optic Fault LED* section in this table for additional information.		

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Table B. Troubleshooting with Front-Panel Indicators *(Continued)*

Indicator Color	Meaning	Possible Cause	Corrective Action
Optic Fault LED ( )			
Green	The optical signal is being received and laser is operating properly.	—	No action required.
Red	The optical signal is not being received.	Remote module is not powered on.	Check power connections. Replace power supply if necessary.
		Fiber optic cable is not connected.	Check fiber optic connections.
		Fiber optic cable connectors are dirty or are damaged.	Clean, polish, or replace fiber optic cable connectors as necessary.
		Fiber optic cable is defective.	Replace cable.
		Optical dB losses in the fiber optic installation exceed the optical power budget specification stated in *Specifications* on page 24.	Check for problems with the fiber optic installation, for example, excessive dB losses in connectors, splices, patch panels, cables, and so on.
		Optical dB losses in the fiber optic installation meet the optical power budget specification stated in *Specifications* on page 24; however, a module is defective.	Contact Product Support at 1-559-292-1981.
Flashing red	Laser has shut down.	Module is operating in extreme environmental conditions; for example, operating temperature is below or above recommended range as stated in *Specifications* on page 24.	Ensure that module operates according to operating conditions stated in *Specifications* on page 24, and then cycle the power. If problem persists, contact Product Support at 1-559-292-1981.
		Laser has reached end of life.	Cycle the power. If problem persists, contact Product Support at 1-559-292-1981.

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Table C. Troubleshooting with Rear-Panel Indicators

Indicator Color	Meaning	Possible Cause	Corrective Action
RJ-45 10BASE-T/100BASE-TX Port Status LED - Left (Link/Activity)			
Amber	A 10BASE-T link is established.	—	If 10BASE-T operation is desired, no action is required. If 10BASE-T operation is not desired, refer to *Setting 10BASE-T/100BASE-TX Port Modes of Operation* on page 10 for information.
Flashing amber	Data activity is occurring on the 10BASE-T link; data is being transmitted or received.	—	If 10BASE-T operation is desired, no action is required. If 10BASE-T operation is not desired, refer to *Setting 10BASE-T/100BASE-TX Port Modes of Operation* on page 10 for information.
Green	A 100BASE-TX link is established.	—	If 100BASE-TX operation is desired, no action is required. If 100BASE-TX operation is not desired, refer to *Setting 10BASE-T/100BASE-TX Port Modes of Operation* on page 10 for information.
Flashing green	Data activity is occurring on the 100BASE-TX link; data is being transmitted or received.	—	If 100BASE-TX operation is desired, no action is required. If 100BASE-TX operation is not desired, refer to *Setting 10BASE-T/100BASE-TX Port Modes of Operation* on page 10 for information.

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Table C. Troubleshooting with Rear-Panel Indicators *(Continued)*

Indicator Color	Meaning	Possible Cause	Corrective Action
RJ-45 10BASE-T/100BASE-TX Port Status LED - Left (Link/Activity) (Continued)			
Not lit	A 10BASE-T or 100BASE-TX link cannot be established.	A problem may exist with the cable: • Cable is not connected to the module or to the 10BASE-T/100BASE-TX compatible device. • Cable is defective. • Cable is not the proper cable type. • Cable is not the proper length.	Do any of the following as applicable: • Connect the cable. • Replace the cable. Use Cat5e or higher cable. • Ensure that cable is proper length. Cable length must not exceed 128 feet (100 meters).
		Device connected to the module is not powered on.	Power on the device connected to the module.
		Duplex mode setting (half-duplex or full-duplex) does not match the duplex mode setting of the remote module.	Set the duplex mode setting on modules to match one another (autonegotiation or forced half-duplex or full-duplex). Refer to *Setting 10BASE-T/100BASE-TX Port Modes of Operation* on page 10 for information.
		Port on module is defective.	Replace the module

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Table C. Troubleshooting with Rear-Panel Indicators *(Continued)*

Indicator Color	Meaning	Possible Cause	Corrective Action
RJ-45 10BASE-T/100BASE-TX Port Status LED - Right (Duplex/Collision)			
Amber	Port is set to 10BASE-T full-duplex mode.	—	If 10BASE-T full-duplex operation is desired, no action is required. If 10BASE-T full-duplex operation is not desired, refer to *Setting 10BASE-T/100BASE-TX Port Modes of Operation* on page 10 for information.
Flashing amber	Port is set to 10BASE-T half-duplex mode and network collision has occurred.*	Normal or excessive collisions occur on a half-duplex link.*	If a normal collision occurs, no action is required. If a problem with the network exists due to excessive collisions, do any of the following as appropriate: • If half-duplex mode is not required, set the TX Mode switch to full-duplex mode by means of auto negotiation or by forcing the mode (refer to *Setting 10BASE-T/100BASE-TX Port Modes of Operation* on page 10 for information). • If half-duplex mode is required, do any of the following as applicable: – Replace network cable if it is defective or if it is not the proper cable type. Use Cat5e or higher cable. – Ensure that cable is proper length. Cable length must not exceed 328 feet (100 meters). – Replace the network interface card (NIC) if it is defective or if it is imcompatible. – Segment the network.

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Table C. Troubleshooting with Rear-Panel Indicators *(Continued)*

Indicator Color	Meaning	Possible Cause	Corrective Action
RJ-45 10BASE-T/100BASE-TX Port Status LED - Right (Duplex/Collision) (Continued)			
Green	Port is set to 100BASE-TX full-duplex mode.	—	If 100BASE-TX full-duplex operation is desired, no action is required. If 100BASE-TX full-duplex operation is not desired, refer to *Setting 10BASE-T/100BASE-TX Port Modes of Operation* on page 10 for information.
Flashing green	Port is set to 100BASE-TX half-duplex mode and network collision has occurred.*	Normal or excessive collisions occur on a half-duplex link.*	If a normal collision occurs, no action is required. If a problem with the network exists due to excessive collisions, do any of the following as appropriate: • If half-duplex mode is not required, set the TX Mode switch to full-duplex mode by means of auto negotiation or by forcing the mode (refer to *Setting 10BASE-T/100BASE-TX Port Modes of Operation* on page 10 for information.) • If half-duplex mode is required, do any of the following as applicable: – Replace cable if it is defective or if it is not the proper cable type. Use Cat5e or higher cable. – Ensure that cable is proper length. Cable length must not exceed 328 feet (100 meters). – Replace the network interface card (NIC) if it is defective or if it is imcompatible. – Segment the network.

(Continued on next page)

Table C. Troubleshooting with Rear-Panel Indicators *(Continued)*

Indicator Color	Meaning	Possible Cause	Corrective Action
RJ-45 10BASE-T/100BASE-TX Port Status LED - Right (Duplex/Collision) (Continued)			
Not lit	Port is set to 10BASE-T half-duplex mode and no collisions are detected.*	—	If 10BASE-T half-duplex operation is desired, no action is required. If 10BASE-T half-duplex operation is not desired, refer to *Setting 10BASE-T/100BASE-TX Port Modes of Operation* on page 10 for information.

*A collision is a normal event on a half-duplex Ethernet link. A collision occurs when two or more devices, referred to as stations, attempt to transmit at the same time on a shared physical medium.

Ethernet uses the CSMA/CD (Carrier Sense Multiple Access/Collision Detect) media access method by which two or more stations share a common transmission medium. Using CSMA/CD, a station monitors the medium and transmits a message in bit-serial form when it senses that no other station is transmitting. If, after initiating a transmission, the message collides with that of another station, each transmitting station then intentionally transmits for an additional predefined period to ensure propagation of the collision throughout the system. To avoid another collision, each station waits a random amount of time (backoff) before attempting to transmit again.

Excessive collisions occur when retransmission of a frame fails after 16 consecutive times and the frame is dropped. Excessive collisions may indicate that the network is becoming congested.

Specifications

PERFORMANCE

Switch Type	Unmanaged Layer 2
Switch Method	Store and forward
Switch Fabric	Non-head-of-line blocking
Data Rate	10/100 Mbps
Compliance	IEEE 802.3, 802.3u, 802.3x
Interface	Auto MDI/MDI-X
Operating Mode	Half-duplex or full-duplex
Address Table Size	1,024 MAC address entries with automatic learning and aging
Quality of Service	IEEE 802.1p priority, tag-based, queues per port, weighted fair queuing scheduling
Maximum Frame Size	Untagged Ethernet frames up to 1,518 bytes Tagged Ethernet frames up to 1,522 bytes

GENERAL

Operating Temperature	-40° to 167°F (-40° to 75°C)
Input Power Requirements	12 VDC or 24 VAC, 0.50 A
LED Indicators	Power 100BASE-FX Port Status (link/activity, FEFI) Optic Fault (optic signal/laser status) 10BASE-T/100BASE-TX Port Status (link/activity and speed, duplex/collision and speed)
Dimensions	8.75" D x 2.28" W x 4.81" H (22.23 x 5.79 x 12.22 cm)
Unit Weight	2.4 lb (1.09 kg) (approximate)

MECHANICAL

Connectors	
Rack Power/Alarm	1, 4-pin connector
Stand-Alone Power	1, 2-pin connector, screw terminal
Electrical	5, RJ-45, 10BASE-T/100BASE-TX
Fiber Optic	1, dual-fiber ST or SC

OPTICAL POWER BUDGET, TRANSMISSION DISTANCE, AND LASER CLASS 1 LIMIT

Model Number	Wavelength (Transmit/Receive)	Optical Power Budget	Maximum Transmission Distance	Laser Class 1 Limit*
Multimode (62.5/125 µm)				
FX82051MSTR-2	1310/1310 nm	26 dB†	6 km (3.7 mi)‡	<15.6 mW
FX82051MSCR-2	1310/1310 nm	26 dB†	6 km (3.7 mi)‡	<15.6 mW
Single-Mode (9/125 µm)				
FX82051SSTR-2	1310/1310 nm	28 dB	46 km (28.6 mi)§	<15.6 mW
FX82051SSCR-2	1310/1310 nm	28 dB	46 km (28.6 mi)§	<15.6 mW

* The FX82051 module is classified by the FDA as a Class 1 laser product.

† When using 50/125 µm multimode fiber, subtract 3 dB from the optical power budget.

‡ Maximum transmission distance is limited by fiber bandwidth.

§ Maximum transmission distance is based on attenuation of 0.5 dB/km plus a 5 dB buffer for connector and splice losses.

NOTES:

- Single-mode FC connector is available upon request. Contact the factory for additional information.
- For conformal coated models, replace the first letter *F* in the model number with the letter *C*. The conformal coated version of FX82051MSTR-2, for example, is CX82051MSTR-2.
- For models with higher optical power budgets, contact the factory.

Appendix. RJ-45 Connector Pinouts

Figure 8 illustrates RJ-45 MDI/MDI-X connector pinouts.

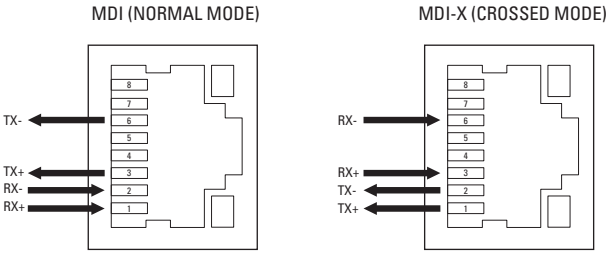

Figure 8. RJ-45 MDI/MDI-X Connector Pinouts

Table D summarizes RJ-45 MDI/MDI-X connector pinouts.

Table D. RJ-45 MDI/MDI-X Connector Pinouts

Pin Number	MDI (Normal Mode)	MDI-X (Crossed Mode)
1	RX+	TX+
2	RX-	TX-
3	TX+	RX+
4	Not used	Not used
5	Not used	Not used
6	TX-	RX-
7	Not used	Not used
8	Not used	Not used

Green The materials used in the manufacture of this document and its components are compliant to the requirements of Directive 2002/95/EC.

This equipment contains electrical or electronic components that must be recycled properly to comply with Directive 2002/96/EC of the European Union regarding the disposal of waste electrical and electronic equipment (WEEE). Contact your local dealer for procedures for recycling this equipment.

PRODUCT WARRANTY AND RETURN INFORMATION

WARRANTY

Pelco will repair or replace, without charge, any merchandise proved defective in material or workmanship **for a period of one year** after the date of shipment.

Exceptions to this warranty are as noted below:

- Five years on fiber optic products and TW3000 Series unshielded twisted pair transmission products.
- Three years on Spectra® IV products.
- Three years on Genex® Series products (multiplexers, server, and keyboard).
- Three years on Camclosure® and fixed camera models, except the CC3701H-2, CC3701H-2X, CC3751H-2, CC3651H-2X, MC3651H-2, and MC3651H-2X camera models, which have a five-year warranty.
- Three years on PMCL200/300/400 Series LCD monitors.
- Two years on standard motorized or fixed focal length lenses.
- Two years on Legacy®, CM6700/CM6800/CM9700 Series matrix, and DF5/DF8 Series fixed dome products.
- Two years on Spectra III™, Esprit®, ExSite™, and PS20 scanners, including when used in continuous motion applications.
- Two years on Esprit and WW5700 Series window wiper (excluding wiper blades).
- Two years (except lamp and color wheel) on Digital Light Processing (DLP®) displays. The lamp and color wheel will be covered for a period of 90 days. The air filter is not covered under warranty.
- Eighteen months on DX Series digital video recorders, NVR300 Series network video recorders, and Endura™ Series distributed network-based video products.
- One year (except video heads) on video cassette recorders (VCRs). Video heads will be covered for a period of six months.
- Six months on all pan and tilts, scanners or preset lenses used in continuous motion applications (that is, preset scan, tour and auto scan modes).

Pelco will warrant all replacement parts and repairs for 90 days from the date of Pelco shipment. All goods requiring warranty repair shall be sent freight prepaid to Pelco, Clovis, California. Repairs made necessary by reason of misuse, alteration, normal wear, or accident are not covered under this warranty.

Pelco assumes no risk and shall be subject to no liability for damages or loss resulting from the specific use or application made of the Products. Pelco's liability for any claim, whether based on breach of contract, negligence, infringement of any rights of any party or product liability, relating to the Products shall not exceed the price paid by the Dealer to Pelco for such Products. In no event will Pelco be liable for any special, incidental or consequential damages (including loss of use, loss of profit and claims of third parties) however caused, whether by the negligence of Pelco or otherwise.

The above warranty provides the Dealer with specific legal rights. The Dealer may also have additional rights, which are subject to variation from state to state.

If a warranty repair is required, the Dealer must contact Pelco at (800) 289-9100 or (559) 292-1981 to obtain a Repair Authorization number (RA), and provide the following information:

1. Model and serial number
2. Date of shipment, P.O. number, Sales Order number, or Pelco invoice number
3. Details of the defect or problem

If there is a dispute regarding the warranty of a product which does not fall under the warranty conditions stated above, please include a written explanation with the product when returned.

Method of return shipment shall be the same or equal to the method by which the item was received by Pelco.

RETURNS

In order to expedite parts returned to the factory for repair or credit, please call the factory at (800) 289-9100 or (559) 292-1981 to obtain an authorization number (CA number if returned for credit, and RA number if returned for repair).

All merchandise returned for credit may be subject to a 20% restocking and refurbishing charge.

Goods returned for repair or credit should be clearly identified with the assigned CA or RA number and freight should be prepaid. Ship to the appropriate address below.

If you are located within the continental U.S., Alaska, Hawaii or Puerto Rico, send goods to:

Service Department
Pelco
3500 Pelco Way
Clovis, CA 93612-5699

If you are located outside the continental U.S., Alaska, Hawaii or Puerto Rico and are instructed to return goods to the USA, you may do one of the following:

If the goods are to be sent by a COURIER SERVICE, send the goods to:

Pelco
3500 Pelco Way
Clovis, CA 93612-5699 USA

If the goods are to be sent by a FREIGHT FORWARDER, send the goods to:

Pelco c/o Expeditors
473 Eccles Avenue
South San Francisco, CA 94080 USA
Phone: 650-737-1700
Fax: 650-737-0933

REVISION HISTORY

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C2622M	2/07	Original version.

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